



Seminar

Modeling and Simulation of Dynamical Systems

The IEEE Control Systems Society is pleased to announce this introductory seminar about important topics in the modeling and simulation of dynamical systems. Experts from the academia and industry will discuss the theory, practice, and available software and hardware tools during five 50-minute sessions. The seminar is for engineers who develop or utilize such models.

Scope and Purpose:

Modern control systems are more complex and perform more functions than ever before. The controlled systems typically comprise existing subsystems, commercially available components, as well as custom subsystems. Their development requires the collaboration of multi-disciplinary engineering teams who often work in different locations distributed around the globe. Traditional product development processes can be insufficient to address the increasing system complexity, the pressure to shorten the time to market, and market demands for more functionality with higher reliability. Many companies modify or transform their development processes to exploit a model-based design approach. Models as executable specifications clarify and communicate requirements and specifications and are replacing traditional, paper-based specifications. Subsystem concepts are simulated before the real subsystems are available, and multi-domain models simulate the system-level behavior of new designs. This multi-domain, model-based design approach requires engineering skills at a systems level rather than in a single domain, including strong modeling and analytical skills, computer hardware and software, and the mathematical modeling of dynamic systems. This seminar offers an introduction to the modeling and simulation of dynamical systems and a selection of helpful hardware and software tools.

Date: Saturday, 5 February 2011

Place: Cogswell Polytechnical College, 1175 Bordeaux Drive, Sunnyvale, CA 94089

Cost: \$20 students (full-time), \$40 IEEE members, \$60 Non-members, \$100 Corporate sponsors. Please register at <http://css-seminar2011a.eventbrite.com>.

Program:

Welcome	08:45 – 09:10am	Coffee and bagels, seminar kickoff at 9:00am
Session 1	09:10 – 10:00am	Mathematical models of dynamical systems Instructor: Dr. P.K. Menon, Optimal Synthesis
Session 2	10:10 – 11:00am	System Identification - Theory and Practice Instructor: Dr. Mark B. Tischler, Ames Research Center
Session 3	11:10 – 12:00am	Simulation with Hardware and Software Tools Instructors: Dr. Martin Aalund, Dr. Karl Mathia
Lunch	12:00 – 12:30pm	Sandwiches, sodas, discussions and product demos
Session 4	12:30 – 01:20pm	Visualization and Virtual Environments Instructor: Dr. Hadi Aggoune, Cogswell Polytech. College
Session 5	01:30 – 3:00pm	Applications of Hardware-in-the-Loop Simulators Instructor: Christoph Wimmer, National Instruments

Who should attend: engineers and scientists who model and simulate dynamical systems or who utilize such models.

Speaker Biographies

Dr. P.K. Menon (Session 1)

Dr. Menon is the Chief Scientist, President and founder of Optimal Synthesis Inc., a company focused on Control Systems and Signal Processing Technology development for the aerospace engineering industry. He served as an Associate Professor of aerospace engineering at Georgia Institute of Technology, Visiting Scientist at NASA Ames Research Center, Adjunct Professor of Mechanical Engineering at Santa Clara University, Research Scientist at Integrated Systems Inc, and as a Mission Analyst at the Indian Space Research Organization. Dr. Menon has over 36 years of experience in the aerospace industry, and has published over 40 papers in the AIAA and IEEE journals, and over 120 papers in international conferences. He is the recipient of the 1994 M. Barry Carlton Award from the IEEE, the 2000 Engineer of the Award from AIAA San Francisco Section, the 2003 Best paper of the Conference Award from the AIAA, three technology awards from NASA, and the Adjunct Lecturer of the Year award from Santa Clara University. In 2010, he was elected a Fellow of the AIAA for innovative contributions towards the development of next-generation air traffic flow management algorithms and integrated nonlinear flight control system design methods. Dr. Menon received his Ph. D degree in 1983 from Virginia Polytechnic Institute under the direction of Professor Henry J. Kelley, an ME degree in Aeronautical Engineering from the Indian Institute of Science in 1975 and a BE degree in Mechanical Engineering from Osmania University in 1973. He is a Senior Member of the IEEE, member of Sigma Xi and Sigma Gamma Tau - the aerospace honor society. Dr. Menon is a member of the American Radio Relay League, and the Experimental Aircraft Association.

Dr. Mark B. Tischler (Session 2)

Mark B. Tischler is an Army Senior Technologist (ST) and Senior Scientist at the Army Aeroflightdynamics Directorate located at the Ames Research Center. He is closely involved in the strategic planning of future Army rotorcraft research programs. He represents Army research interests in interagency and international cooperations, including as US Technical Project Officer for the US/Israel Memorandum of Agreement. Dr. Tischler also leads the Flight Control Technology group which conducts research in handling qualities and flight control with applications to manned and unmanned aircraft and rotorcraft. He led development of CIFER® and CONDUIT®, two widely-used software tools for conducting aircraft system identification and flight control system design optimization. Dr. Tischler is widely consulted for flight control expertise on numerous US aircraft programs, including his most current work in support of the Army Armed Reconnaissance helicopter, UH-60MU, CH47G, unmanned BURRO and FireScout helicopters, the Boeing 787, and the Cessna Aircraft Company.

Dr. Tischler has authored or co-authored over 110 technical papers and two highly respected books, including the recently published "Aircraft and Rotorcraft System Identification" (Tischler and Remple, AIAA, 2006). He has received many prestigious awards for his work over the years, including most recently the 2009 Presidential Rank Award for Distinguished Senior Professional. He received BS and MS degrees in Aerospace Engineering from the University of Maryland, and his Ph.D. from the Department of Aeronautics and Astronautics at Stanford University. Dr. Tischler has also served as primary research advisor for 27 Masters and PhD students that have conducted their thesis work under his guidance.

Dr. Martin Aalund (Session 3)

Dr. Martin Aalund's is an expert in robotics and automation. He is experienced in both industry and academia and has led the development of numerous automation systems for the global semiconductor industry. He has served as Director of Engineering for KLA-Tencor's Automation Standards Division and the Films and Scatterometry Technology Group. Earlier in his career, he was VP of Engineering at Aquest Systems Inc, Director of the Advanced Technology Group at PRI Automation, Inc., and Director of electrical engineering for Smart Machines, which manufactured robotic handling systems for both wafers and flat panel substrates. Dr. Aalund has also pioneered automation solutions for the industrial and pharmaceutical markets at McKesson,

where he was responsible for developing both hardware and embedded software for the company's automated prescription systems. Dr. Aalund began received his Ph.D. in mechanical engineering from the University of Texas. He later went on to become a group leader at the University's Austin Robotics Group - the largest mechanical engineering robotics research organization in the United States. Dr. Aalund also was a founder of ARM Automation, developing innovative modular robotic and control systems for the food, welding, nuclear and assembly industry. A well published author and holder of several automation patents, Dr. Aalund was also a professor of electrical engineering at Santa Clara University, Santa Clara, California.

Dr. Karl Mathia (Session 3)

Dr. Karl Mathia is a systems and controls engineer in the areas of control systems, automation, and robotics. He has 20 years of experience in the research and development of automation and robotic systems. Dr. Mathia received an M.S. in Electrical Engineering from the Technical University in Munich, Germany, and a Ph.D. in Electrical and Computer Engineering from Portland State University, Portland, Oregon. He is the author of the book "Robotics for Electronics Manufacturing – Principles and Applications in Cleanroom Automation", published by Cambridge University Press in 2010. Dr. Mathia is a Senior Member of the IEEE and is the Chair of the IEEE Control Systems Society (CSS) - Santa Clara Valley Chapter.

Dr. Hadi Aggoune (Session 4)

Dr. Aggoune received his Ph.D. in Electrical Engineering from the University of Washington in Seattle, WA. He served as faculty at the University of Washington, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia, and The National Polytechnic School, Algiers, Algeria. Currently, he is the Roy C. Anderson Chair Professor and Director of Engineering programs at Cogswell Polytechnical College in Sunnyvale, CA. Dr. Aggoune is the Founder and Director of the Engineering Simulation and Animation Laboratory (ESAL) and winner of the Boeing Performance Excellence Award. He is the Principal Investigator on research and development projects sponsored by the Boeing Company. Dr. Aggoune is a Senior Member of IEEE and a Professional Engineer registered in the State of Washington. His research and development interests include modeling, simulation, and visualization.

Christoph Wimmer (Session 5)

Christoph graduated from Graz University of Technology in Austria with a master's degree in electrical engineering with the focus on control systems. He started working at National Instruments in 1998 and is currently working as business development manager for industrial measurements and control for Washington, Oregon, and California. Using his expertise in real-time, embedded, and industrial monitoring and control, Christoph focuses on assisting customers with system simulation, rapid control prototyping, and hardware in the loop applications.